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Abstract (182 words)

Parental unemployment is associated with worse adolescent mental health, but prior evidence is primarily based on cross-sectional studies subject to reverse causality and confounding. We assess the association between parental unemployment and changes in adolescent psychotropic medication purchases with longitudinal individual-level fixed-effects models that control for time-invariant confounding. We use a large register-based panel of Finnish adolescents aged 13-20 in 1987-2012 (N=138,644), with annual measurements of mothers' and fathers' employment and offspring psychotropic medication purchases. We assess changes in the probability of adolescent psychotropic medication purchases in the years before, during, and after the first episode of parental unemployment. There was no association between mother's unemployment and offspring psychotropic purchases in the fixed effect models, suggesting this association is largely driven by unmeasured confounding and selection. By contrast, father's unemployment led to a significant 15-20% increase in the probability of purchasing psychotropic medication among adolescents even after extensive controls for observed and unobserved confounding. This change takes at least a year to emerge, but it is long-lasting and calls for policies that mitigate the effect of father's unemployment on offspring's mental wellbeing.

Abbreviations

CI Confidence Interval

FE Fixed Effects

OLS Ordinary Least Squares

Running Head

Parental unemployment and adolescent psychotropics

Keywords

Unemployment

Parent

Adolescent Health

Mental Health

Longitudinal Study

Confounding Factors

Population Register

Psychotropic Drugs

Words

3330

Environmental exposures play an important role in the etiology of common adolescent mental health problems such as depression and anxiety (1). One potential environmental risk factor is parental unemployment, a common exposure among adolescents. In 2014, in OECD countries, 10% of children aged 0-14 lived in jobless households (2). Parental unemployment can affect offspring mental health in multiple ways. Firstly, unemployment may compromise the mental health of a parent (3,4), which may induce offspring mental health problems (5). Second, the economic strain of unemployment may increase marital conflict as well as conflicts between parents and offspring and these in turn may affect the emotional wellbeing of the offspring (6). Lack of economic resources in the family may also affect offspring mental health through hindering social participation with peers (7).

An increasing body of evidence suggests that parental unemployment is associated with adolescent mental health problems and worse well-being (8–21), yet not all studies find an association (22–24). Most previous studies are, however, cross-sectional and have thus been unable to assess the potential for reverse causality, i.e. the possibility that offspring mental health problems precede parental unemployment. Some studies using prospective longitudinal data have shown higher odds of suicide and attempted suicide among adolescents and young adults with a history of parental unemployment (11,19). However, even in longitudinal studies, where exposure to parental unemployment is measured before health outcomes, unmeasured differences between exposed and unexposed adolescents may bias associations. Among the few studies trying to address this bias, a longitudinal study using individual fixed-effects models found that adolescents exposed to parental unemployment at ages 14-15 experienced a reduction in happiness, whereas adolescents exposed at ages 11-13 in fact experienced an increase in happiness (25).

In this study we aim to disentangle the nature of the association between parental unemployment and adolescent mental health. We use nationally representative longitudinal register-data on 138,644 Finnish adolescents to assess the association between father's and mother's unemployment and offspring psychotropic medication purchases at ages 13–20. By using an individual fixed-effects design, that infers effects only from within-individual changes in exposure and outcome, we attempt to control for all stable differences between adolescents and families. An important consideration is the time lag between parental unemployment and offspring mental health. Previous studies have not distinguished between short and long-term effects of parental unemployment. Parental unemployment may cause immediate, short-term effects on offspring mental health, but these effects may fade out as the family adapts. Conversely, it is possible that the effects are not immediate, but develop gradually and can only be detected some years after parental unemployment. Therefore we distinguish between immediate and long-term changes in psychotropic purchases. We also assess adolescent psychotropic purchases in the years prior to parental unemployment, as well as possible mechanisms, including changes in household income, family structure and parental mental health. Our outcome measure, annual purchases of prescribed psychotropic medication, reflects changes in the presence and severity of adolescent mental health problems but also changes in drug purchasing and prescribing. It is likely to capture the more severe end of mental health problems and problems for which pharmaceutical treatment was followed.

MATERIALS AND METHODS

Sample

The data were formed by individual-level linkages between administrative registers using unique personal identification codes available for all permanent residents of Finland. From these data

Statistics Finland drew a 20% random sample of households from the end of year 2000 with at least one child aged 0–14, including all household members, supplemented with all non-coresident parents of the 0–14-year-olds in the household sample. All parents and offspring were linked with annual information on socioeconomic position, labor market participation and living arrangements in 1987–2012 from the registers of Statistics Finland as well as information on all prescription medication purchases in 1995–2012 from the National Prescription Register of the Social Insurance Institution of Finland.

For this study we included birth cohorts 1986-1997 (n=153,179) for whom at least two consecutive years of follow-up at ages 13-20 were available during the study period. We excluded adolescents who were not living in private households (e.g. due to institutional care) throughout follow-up (n=4,909), those who emigrated or died before age 14 (n=1,128), those who immigrated after age 13 (n=20), and those with both parents unknown (n=311). For the remaining adolescents (n=146,811), we linked annual information on the employment status and other sociodemographic characteristics of each parent, irrespective of coresidence with the offspring. To assess the effect of a parent *becoming* unemployed we limited our analyses to adolescents with an employed mother (n=119,179, 81%) or employed father (n=121,872, 83%) at age 12. These two cohorts were analyzed separately assessing the first unemployment of the mother and the father respectively (Table 1). Altogether our final data included 138,644 adolescents, because for most adolescents both parents were employed at age 12.

Measurements

The outcome was an annual binary measure of having at least one purchase of psychotropic medication over a calendar year (yes/no). Psychotropic medications included antidepressant,

antipsychotic, anxiolytic, sedative, and hypnotic medication (codes N05A, N05B, N05C, N06A, N06BA, and N06C in the Anatomical Therapeutic Chemical Classification system). In Finland, psychotropic medication is available only from authorised pharmacies by prescription from a medical doctor after clinical assessment and diagnosis. As the propensity to seek treatment for mental health problems is driven by severity (26,27) our measure is likely to capture the most severe end of adolescent mental health problems.

Employment status was based on the main activity in the last week of the year and included categories *employed* if the parent had an ongoing employment contract or was self-employed, *unemployed* if the parent was registered as actively looking for employment and *inactive* otherwise. The employment status of each parent was assessed separately. We identified the first time between offspring ages 13-20 each parent became unemployed, i.e. was employed in one year and unemployed the next. The follow-up years were then coded as (0) *Years before first unemployment*, (1) *1st year after unemployment*, (2) *Subsequent years* after unemployment. All follow-up years of adolescents whose parent never became unemployed were included in the 0-category. Years after a parent's death or emigration were coded separately as (3) *Parent not in population*. These years were included in the analyses but the estimates are not shown.

Parental education (*Tertiary*, *Upper secondary*, and *Basic*), psychotropic purchase (*No/Yes/Parent not in population*), and experience of any unemployment between offspring ages 1-12 (N*o/Yes*) were assessed for each parent separately. Disposable income of the household where the adolescent was living included the net incomes of all household members including wages, capital income and social benefits. To take into account the household structure, we divided the total income by the number of consumption units in the household by using the OECD equivalence scale (28). We then calculated annual quintiles across all adolescents in the data in a given year. Family type was

categorized as living with *two parents,* with *a single parent,* and living *independently.* Number of under-aged children in the parental family was categorized as *1*, *2*, *3+*, or *Not in family* if the offspring was living independently.

Statistical Analysis

We predicted the annual probability of offspring psychotropic medication purchases at ages 13-20 according to the unemployment of each parent in the previous year with four models. Model 1 was an ordinary least squares (OLS) model controlling for offspring sex and 1-year categorical age. This model yields the percentage-point difference in the probability of psychotropic purchases between years after first parental unemployment compared to the years before. In order to differentiate between immediate and long-term changes in psychotropic purchases we categorized the exposure as *1st year* and *Subsequent years* after parental unemployment. To account for observed baseline differences between offspring with and without parental unemployment, in Model 2 we added controls for parental education, parental psychotropic purchases, prior parental unemployment, household income, number of children in the parental family, and family type of the offspring at age 13. In Model 3 we included individual fixed effects (FE) controlling for age. This model controls for all observed and unobserved time-invariant differences between adolescents as it uses within-individual variation in parental unemployment to predict within-individual variation in psychotropic purchases (29). Model 4 was a fixed-effects model that further included time-varying parental psychotropic purchases, household income quintile, number of children in the parental family and family type at ages 13-20. This model assessed whether changes in these characteristics could explain the association between parental unemployment and offspring mental health.

We further assessed changes in the probability of psychotropic medication purchases up to five years before and after the first exposure to parental unemployment. This was done in order to, firstly, assess potential lagged associations with parental unemployment and, secondly, to inspect potential reverse causality of pre-existing offspring mental health problems affecting later parental employment status. We fitted age-adjusted and fully-adjusted FE models corresponding to Models 3 and 4 described above. In these models, the exposure was defined as the time (in years) to the first parental unemployment spell between ages 13-20. The exposure variable took on values from -5 to 5 and the reference year t=0 was the year before the first unemployment spell. We thus estimated the change in the probability of offspring psychotropic purchases in each year t=-5 to t=5 with respect to year t=0.

All models were run separately for maternal and paternal unemployment and controlled for characteristics of the parent whose unemployment was being examined. As the data included siblings whose outcomes are likely to be correlated, we calculated clustered standard errors at the level of the given parent. All analyses were performed using STATA 14.1.

RESULTS

The annual prevalence of psychotropic purchases was 0.5-2 percentage-points higher among adolescents with an unemployed mother or father compared to adolescents with employed parents (Figure 1). Among adolescents with an employed parent at age 12, 10% experienced maternal and 11% paternal unemployment between ages 13-20 (Table 1). These adolescents had a higher annual prevalence of psychotropic purchases in follow-up compared to unexposed adolescents (around 4% vs. 3%). Their parents were also more likely to have low education, psychotropic purchases, and earlier unemployment episodes. The exposed children were also more likely to live in low-income

households and single parent families. As all these baseline characteristics predicted psychotropic purchases in follow-up, these differences may confound the association between parental unemployment and offspring psychotropic purchases.

Offspring psychotropic purchases were more prevalent after the first exposure to parental unemployment than in the years before unemployment (Table 2). Controlling for age and sex (Model 1), the probability of psychotropic purchases was 0.61 percentage-points (95% confidence interval: 0.30, 0.92) higher in the first year following maternal unemployment, and 0.83 (0.44,1.22) percentage-points higher in subsequent years. Corresponding figures after father's unemployment were 0.38 (0.08, 0.69) and 0.96 (0.54, 1.37). The short-term increase in the first year following parental unemployment was substantially attenuated after controlling for observed baseline characteristics (Model 2) and disappeared in the fixed-effects models that control for unobserved time-invariant characteristics (Model 3). By contrast, the long-term increase remained significant after both mother's (0.45; 0.02, 0.89) and father's (0.71; 0.29, 1.12) unemployment even after controlling for time-invariant confounding. The long-term increase was partly explained by changes in parental psychotropic purchases, household income and family structure during follow-up, but the association between father's unemployment and offspring psychotropic purchases remained significant (Model 4). There were no significant differences by offspring gender.

In order to assess whether long-lasting unemployment is particularly detrimental, we further reclassified the years after first parental unemployment as (1) 1st year after unemployment, (2) Subsequent years with long-lasting unemployment and (3) Subsequent years without long-lasting unemployment. Long-lasting unemployment referred to episodes of unemployment that lasted for two or more consecutive years, as opposed to unemployment spells that lasted only for one year. We reran our original models with this more nuanced exposure measure and present the results in

Supplementary Table 1. These models revealed no significant differences in the association between parental unemployment and offspring psychotropic purchases according to the length of unemployment.

Figure 2 shows estimates from fixed-effects models of the change in the probability of offspring psychotropic purchases five years before and five years after the first spell of parental unemployment, where the reference year t=0 is the year before the first unemployment spell. In the two years before first maternal unemployment, there was a one percentage-point increase in the probability of psychotropic purchases, but little change afterwards (Model 3). By contrast, in the 3-5 years before father's unemployment, there was a one percentage-point increase in offspring psychotropic purchases, but also a steep increase in the 2-5 years following unemployment. This suggests that while the association between mother's unemployment and offspring psychotropic purchases may be driven by confounding factors preceding unemployment there appears to be a more consistent association between father's unemployment and subsequent offspring psychotropic purchases. These associations were not explained by changes in parental psychotropic purchases, household income or family structure (Model 4).

DISCUSSION

This study used large register-based panel data with extensive controls to assess the association between parental unemployment and adolescent mental health. Our results indicate that some of this association is due to confounding by unobserved differences between exposed and unexposed families. However, our results suggest that there is a 15-20% long-term increase in the probability of offspring psychotropic purchases, which emerges one year after father's unemployment and is robust to a fixed-effects specification with extensive controls. For mother's unemployment, this

increase was less robust and occurred already before first unemployment. Our results thus give support to the hypothesis of a causal long-term effect of father's unemployment on adolescent mental health.

This study makes several contributions to the literature. By using an individual fixed-effects design, we were able to better control for unmeasured time-invariant confounding. Around 25-80% of the association between parental unemployment and adolescent psychotropic purchases was explained by pre-existing and stable differences. This suggests considerable confounding in prior cross-sectional and observational studies that do not control for unobserved heterogeneity (8–24).

Our study also distinguished between immediate and long-term changes in mental health after parental unemployment, and assessed the psychotropic medication purchases of adolescents already before parental unemployment. Prior studies have measured parental unemployment cross-sectionally, which conflates both immediate and long-term associations (8–24). We showed that changes in the long term were larger and more consistent than in the short term. This may relate to our measurement of offspring mental health because psychotropic medication purchases are likely to follow the incidence of mental health problems with some lag, and only capture the most severe mental health problems treated with psychotropic medication. More consistent immediate changes could be observed with a more direct and sensitive measure of mental health. There is prior cross-sectional evidence that long-lasting parental unemployment is more strongly associated with adolescent mental health than shorter unemployment spells (10). In contrast, our longitudinal sensitivity-analyses with fixed-effects modeling suggested no additional risk related to long-lasting unemployment.

We examined whether changes in household income, family structure and parental psychotropic medication purchases were mechanisms that could explain the increases in offspring psychotropic purchases after parental unemployment. We found that these factors explained some but not all of the long-term increase in the probability of purchasing psychotropic medication after parental unemployment. In particular, the increased probability of offspring psychotropic purchases after father's unemployment remained unexplained. One potential explanation might be that mechanisms are different for paternal and maternal unemployment and our measurements may not capture them equally well. Firstly, women may be more likely to react to stressful life-events such as unemployment by depression and anxiety, disorders commonly treated by psychotropics, whereas men may be more likely react by behavioral disorders such as alcohol or other substance abuse (30,31), not captured by our register data. If changes in alcohol use could be assessed, they could go further in explaining the increases in offspring psychotropic purchasing after father's unemployment. Secondly, women may also be more likely to seek psychotropic treatment for their mental health problems, and thus more likely to be captured by our measure (32). The current empirical evidence is, however, mixed for both the gendered responsivity hypothesis and the gendered treatment seeking patterns (30–32).

While we find consistent changes in offspring psychotropic medication purchases after father's unemployment, the results for mother's unemployment were less consistent and potentially driven by reverse causality. This is consistent with prior literature examining impacts of parental unemployment on outcomes other than health. For example, prior studies suggest that there is a strong effect of father's unemployment on children's school performance, but no effect of maternal unemployment (33–35). A common explanation is that mother's unemployment has weaker effects on their own psychological well-being than father's unemployment, as the latter are more often perceived as primary providers. The weaker effects of unemployment on women has indeed been

found in many studies (36–38). Some studies, however, suggest that unemployment among single mothers have significant detrimental effects on children's educational and psychological outcomes, suggesting that the effect may be stronger when mothers are primary providers (39). Maternal unemployment may also have a stronger association with offspring mental health in the Nordic countries where the two-earner family is the norm. Previous cross-sectional studies on offspring mental health outcomes have yielded mixed results on the relative importance of maternal and paternal unemployment (10,11,18,19,23–25,40,41) but mother's unemployment has been shown to be more or as detrimental to offspring health as father's unemployment mostly in Nordic studies (11,18,19,25,40).

Methodological considerations

This study used longitudinal, nationally representative data on parents and offspring based on individual-level linkages of routinely collected administrative registers. These registers have full national coverage, good quality and practically no non-response or attrition (42,43). This is a major strength when assessing unemployment and mental health problems, phenomena both related to selective non-response and loss to follow-up (44). Furthermore, the large longitudinal sample enabled the use of individual fixed-effects models, which often suffer from imprecision of estimates due to reduced statistical power (29,45,46). Some limitations, however, should be acknowledged.

Our models do not control for possible unobserved time-varying confounders that affect both changes in parental employment status and offspring psychotropic purchases. In our full model we controlled for changes in parental psychotropic purchases, household income and family structure that could act as either confounders or mechanisms for the parental unemployment effect. However, unmeasured changes in family circumstances such as parental alcohol or other substance use

leading to both parental unemployment and offspring psychotropic purchases could still confound our results.

In Finland, psychotropics are only available by prescription from a medical doctor after clinical assessment of mental health problems. However, not all adolescents with mental health problems seek treatment, so our measure captures a combination of mental health problems and willingness and ability to seek treatment. The propensity to seek treatment may be driven by factors such as stigma and preference for self-reliance (47). To the extent that these factors are time-invariant, they are controlled for by our individual fixed-effects model. Furthermore, due to adverse side-effects, non-pharmacological treatment options such as psychotherapy are often the primary option for adolescent mental health problems. This implies that adolescents suffering from mental health problems who do not seek treatment, those who do not receive a prescription and those who receive a prescription but do not purchase the prescribed drugs are not captured by our measure. Among Finnish adults with depression, only 25% used antidepressants in 2000 and the likelihood of treatment increased with depression severity, duration, and perceived disability (26,27). This is probably reflected in our measure of adolescent psychotropic use because the majority (78%) of psychotropics were antidepressants. We are thus likely to capture only the more severe end of adolescent mental health problems.

Conclusions

Our results suggest that father's unemployment leads to a significant increase in the probability of purchasing psychotropic medication among adolescents. This change is not immediate and takes at least a year to emerge, but is long-lasting. These findings highlight the need for policies that mitigate the negative consequences of father's unemployment on offspring's mental wellbeing.

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All authors contributed to the conception and design of the study, HM conducted the literature review, performed the statistical analyses and drafted the first version of the article. MA and PM revised it critically for important intellectual content. All authors approved the final version.

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The authors declare that they have no conflicts of interest.

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FIGURE LEGENDS

Figure 1. Prevalence of Psychotropic Medication Purchases by Age and Employment Status of Mother (Panel A) and Father (Panel B) Among Adolescents With Employed Mother/Father at Age 12, Finland, 1987–2012.

Figure 2. Change in the Probability of Psychotropic Medication Purchases[a] at Ages 13-20 in the Years Before and After First Unemployment of Mother (Panel A) and Father (Panel B), Among Adolescents With Employed Mother/Father at Age 12, Finland, 1987–2012. Abbreviations: FE=Fixed-Effects. [a] The estimates from linear probability models are multiplied by 100 to obtain the presented percentage-point changes. Model 3: FE model adjusted for 1-year categorical age; Model 4: M3+time-varying characteristics in follow-up (parental psychotropic purchases[b], household income quintile, number of children in the family, family type at ages 13-20). [b] Parental characteristics refer to the parent whose unemployment is assessed.

Table 1. The Baseline Distribution (Age 13) and Yearly Prevalence of Psychotropic Medication Purchases in Follow-Up (Ages 13–20) by Baseline Characteristics and Exposure to Parental Unemployment in Follow-Up. Adolescents With Employed Mother/Father at Age 12, Finland, 1987–2012.

	Mother's unemployment in follow-up				Father's unemployment in follow-up			
	Yes	No	Yes	No	Yes	No	Yes	No
	Baseline distribution (%)[a]		Prevalence of psychotropic medication purchases in follow-up (%)[b]		Baseline distribution (%)[a]		Prevalence of psychotropic medication purchases in follow-up (%)[b]	
Parental education[c]								
Tertiary	28.0	48.7	3.5	3.0	22.1	38.7	3.5	3.0
Upper secondary	51.7	41.5	3.8	3.2	52.3	44.3	4.1	3.1
Basic	20.2	9.7	4.2	3.3	25.7	17.1	3.9	3.2
Parental psychotropic purchases[c]								
No	85.5	88.8	3.3	2.8	90.4	92.9	3.7	2.9
Yes	14.5	11.2	7.0	5.6	9.6	7.1	5.9	5.3
Household income quintile								
Highest	11.2	22.5	4.0	3.4	10.8	22.0	4.4	3.6
4	13.8	22.6	4.1	3.4	15.7	21.6	4.1	3.3
3	19.4	22.6	3.7	3.0	21.3	21.4	3.9	2.8
2	26.0	20.1	3.3	3.0	26.3	19.2	3.3	3.0
Lowest	29.7	12.2	3.2	3.0	26.0	15.8	3.6	2.9
Number of children in parental family								
1	25.3	21.7	6.4	5.6	24.0	19.6	7.2	5.3
2	40.3	45.7	4.2	3.7	41.8	43.9	4.2	3.6
3+	34.1	32.5	3.9	3.0	33.9	36.3	3.9	3.0
Not in family	0.3	0.1	3.4	2.9	0.3	0.2	3.9	2.8

Family type										
	Two parents	73.3	82.7	3.5	2.9		75.4	85.1	3.6	2.9
	Single parent	26.5	17.2	4.6	4.4		24.3	14.7	5.0	4.3
	Independent	0.3	0.1	6.4	5.6		0.3	0.2	7.2	5.3
Exposure to parental unemployment at ages 1-12[c]										
	No	33.1	69.5	3.3	3.0		44.1	80.2	3.6	2.9
	Yes	66.9	30.5	4.1	3.5		55.9	19.9	4.2	3.5
All		100.0	100.0	3.8	3.1		100.0	100.0	3.9	3.1
N		12115	107064				13418	108454		
%		10.2	89.8				11.0	89.0		
Person-years		82093	659056				89413	671378		

[a] Age 13. All differences in distributions between those with and without parental unemployment significant at the 5% level.

[b] Ages 13-20. All differences in psychotropic purchases across groups significant at the 5% level

[c] Parental characteristics refer to the parent whose unemployment is assessed, figures for adolescents with no mother (0.1%) or father (0.2%) in population at baseline (age 13) not shown.

Table 2. Percentage-Point Change in the Probability of Psychotropic Medication Purchases at Ages 13–20 by Parental Unemployment. Adolescents With Employed Mother/Father at Age 12, Finland, 1987–2012.

	OLS Model 1[a]			OLS Model 2[b]			FE Model 3[c]			FE Model 4[d]			*P* value[e]
	Coef.[f]	95 %	CI	Coef.[f]	95 %	CI	Coef.[f]	95 %	CI	Coef.[f]	95 %	CI	
Mother's unemployment													
Years before first unemployment	Ref.			Ref.			Ref.			Ref.			
1st year after unemployment	0.61	0.30,	0.92	0.50	0.19,	0.81	0.21	-0.19,	0.61	0.19	-0.21,	0.59	0.649
Subsequent years	0.83	0.44,	1.22	0.68	0.29,	1.07	0.45	0.02,	0.89	0.35	-0.09,	0.78	0.828
Father's unemployment													
Years before first unemployment	Ref.			Ref.			Ref.			Ref.			
1st year after unemployment	0.38	0.08,	0.69	0.27	-0.04,	0.57	0.07	-0.29,	0.42	0.04	-0.31,	0.40	0.134
Subsequent years	0.96	0.54,	1.37	0.77	0.35,	1.18	0.71	0.29,	1.12	0.60	0.19,	1.02	0.922

Abbreviations: CI=Confidence Interval; Coef.=Coefficient; FE=Fixed-Effects; OLS=Ordinary Least Squares; Ref.=Reference category

[a] Model 1: OLS adjusted for 1-year age-dummies and sex;

[b] Model 2: M1+baseline characteristics[f] (parental unemployment at ages 1–12, parental education, parental psychotropic purchases, household income quintile, number of children in the family, and family type at age 13).

[c] Model 3: FE adjusted for 1-year age-dummies

[d] Model 4: M3+time-varying characteristics[g] in follow-up (parental psychotropic purchases, household income quintile, number of children in the family, family type at ages 13–20)

[e] *P* value for gender interaction, FE Model 4.

[f] The estimates from linear probability models are multiplied by 100 to obtain the presented percentage-point changes

[g] Parental characteristics refer to the parent whose unemployment is assessed

Supplementary Table 1. Percentage-Point Change in the Probability of Psychotropic Medication Purchases at Ages 13–20 by Length of Parental Unemployment. Adolescents With Employed Mother/Father at Age 12, Finland, 1987–2012.

	OLS Model 1[a]			OLS Model 2[b]			FE Model 3[c]			FE Model 4[d]		
Mother's unemployment	Coef.[e]	95%	CI	Coef.[e]	95%	CI	Coef.[e]	95%	CI	Coef.[e]	95%	CI
Years before first unemployment	Ref.			Ref.			Ref.			Ref.		
1st year after unemployment	0.61	0.30,	0.92	0.50	0.19,	0.81	0.22	-0.19,	0.62	0.20	-0.21,	0.60
Subsequent years with long-lasting unemployment	0.95	0.33,	1.58	0.72	0.10,	1.34	0.12	-0.46,	0.70	0.06	-0.52,	0.64
Subsequent years, without long-lasting unemployment	0.80	0.39,	1.21	0.67	0.26,	1.08	0.54	0.09,	1.00	0.42	-0.03,	0.88
Father's unemployment												
Years before first unemployment	Ref.			Ref.			Ref.			Ref.		
1st year after unemployment	0.38	0.08,	0.69	0.27	-0.04,	0.57	0.07	-0.29,	0.42	0.04	-0.31,	0.40
Subsequent years with long-lasting unemployment	0.87	0.29,	1.45	0.58	0.00,	1.16	0.60	0.05,	1.15	0.53	-0.01,	1.08
Subsequent years, without long-	0.99	0.53,	1.44	0.83	0.37,	1.28	0.75	0.30,	1.19	0.63	0.18,	1.08

lasting

unemployment

Abbreviations: CI=Confidence Interval; Coef.=Coefficient; FE=Fixed-Effects; OLS=Ordinary Least Squares; Ref.=Reference category;

[a] Model 1: OLS adjusted for 1-year age-dummies and sex;

[b] Model 2: M1+baseline characteristics[f] (parental unemployment at ages 1–12, parental education, parental psychotropic purchases, household income quintile, number of children in the family, and family type at age 13).

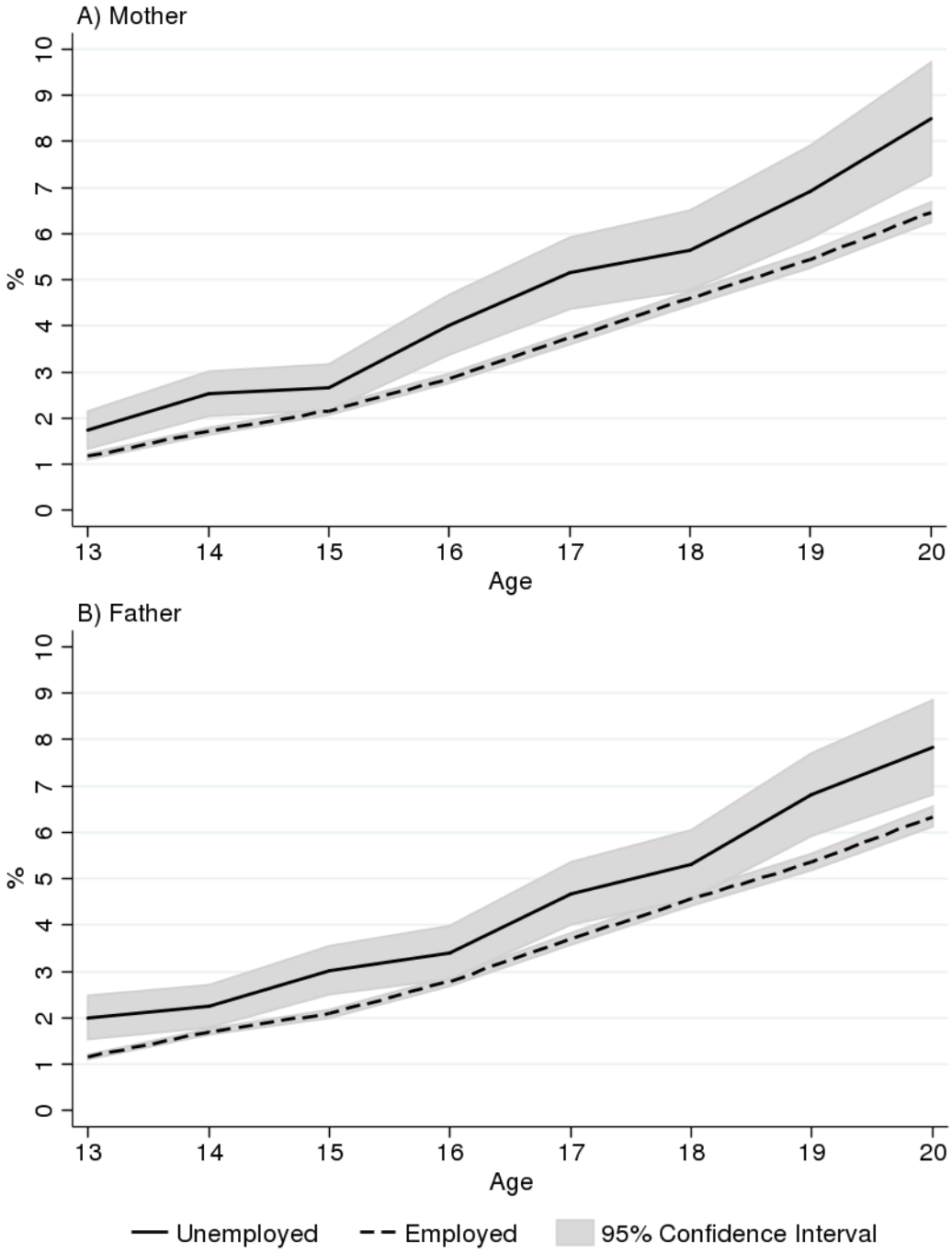
[c] Model 3: FE adjusted for 1-year age-dummies

[d] Model 4: M3+time-varying characteristics[g] in follow-up (parental psychotropic purchases, household income quintile, number of children in the family, family type at ages 13–20)

[e] *P* value for gender interaction, FE Model 4.

[f] The estimates from linear probability models are multiplied by 100 to obtain the presented percentage-point changes

[g] Parental characteristics refer to the parent whose unemployment is assessed



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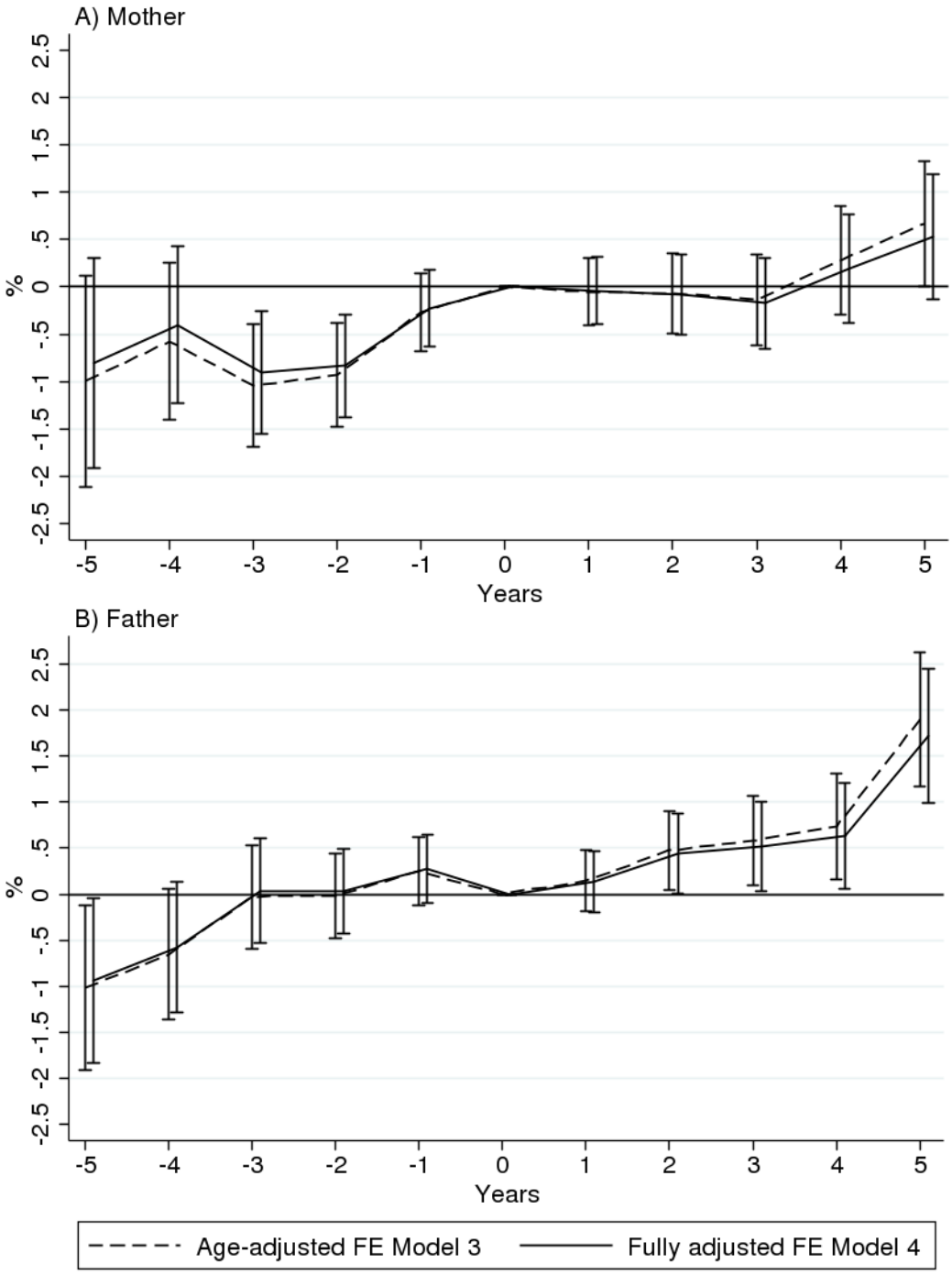

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